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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF WATER

MEMORANDUM

SUBJECT: Operating, Monitoring and Reporting Guidelines for Class IID Commercial Salt Water Disposal Wells - Underground Injection Control Program Guidance #77

FROM: James R. Elder, Director
Office of Ground Water and Drinking Water (WH-550)

TO: Water Management Division Directors
Regions II - X

BACKGROUND

Oil and gas producers unable to afford the cost of developing and maintaining their own salt water disposal wells often utilize commercial disposal facilities to dispose of produced brine in a legally and environmentally acceptable manner. An exact figure for the total inventory of commercial salt water disposal (SWD) facilities is unavailable since a number of States do not differentiate between "commercial" and non-commercial facilities. Existing inventory data and estimates provided by primacy State UIC personnel indicate that there are at least 800 operating commercial well facilities in the 31 oil and gas producing States. This number represents a small subset of the more than 39,000 salt water disposal wells (Class IID) that are currently carried in the overall UIC inventory.

The Mid-Course Evaluation effort raised concerns about the possibility that these wells may be misused, intentionally or not, by the operator, to inject hazardous or other wastes not related to oil and gas production. These concerns are heightened when wastes are delivered to the facility by truck.

A survey of States' Class II operating, monitoring and reporting practices was conducted in support of the Mid-Course Evaluation effort in 1988. Results of this survey were updated and additional data obtained and/or verified by direct contact with the various States during the summer of 1990. The results from this extensive survey were then organized in an internal EPA report consisting of both summary and detailed tabular data on individual State practices. A series of options and estimated impacts were then evaluated for applicability to this guidance.

Of the 22 oil and gas producing States previously surveyed, eight States do not distinguish between commercial and non-commercial injection facilities for Class II reporting purposes. No formal responses were provided by the remaining nine (out of the total of 31) States having Class II well inventories; however, it is known that several of these States also do not differentiate between commercial and non-commercial SWD facilities. Discussions with various State UIC personnel confirm that virtually all regulatory staff can and do differentiate between commercial and non-commercial wells - regardless of prescribed regulatory policy. For the purpose of this guidance, a commercial disposal facility is defined as:

> **" A single or multiple well facility that is specifically engaged in the business of underground injection of brine generated by third party producers for a fee or compensation, such as lease concessions, production sharing arrangements, or the right to salvage residual oil. In addition, the produced brine must originate off-site as a result of oil & gas production operations, only, and be transported to the facility by tank truck."**

The Mid-Course Evaluation workgroup recommended that EPA develop a guidance to address these issues. A draft guidance was developed by the UIC Branch and has been reworked by the Class II Advisory Committee chartered on June 6, 1991. This Guidance has been endorsed by the Advisory Committee.

PURPOSE

This guidance sets forth guidelines and procedures to insure a more standardized approach to regulation of commercial brine disposal facilities. Major issues relating to the proper operation of and oversight for these facilities include:

- Manifest systems
- Site Security
- Inspections/field surveillance
- Outreach/operator education

At this time, EPA regulations do not explicitly require the use of a manifest system and a description of an adequate manifest system is included in this guidance solely for information purposes for primacy State program Directors. However, the remainder of the guidance is implementable in the context of the current regulatory scheme. EPA believes that the procedures outlined below are necessary for effective control of commercial facilities. In cases where State regulations are more stringent, then those regulations will take precedence over these

guidelines.

GUIDANCE

I. Manifest Systems

Presently only six of the 22 surveyed States require some type of fluid tracking or manifest system. However, these six States account for the majority of the known inventory of commercial wells. The manifest systems employed by these States vary considerably - both in terms of data and administrative resource requirements. The most successful manifest system requires a three-party (generator, transporter and disposer) system with periodic sampling of the brine.

A joint study by the EPA Office of Solid Waste and the Interstate Oil Compact Commission (EPA/IOCC Project on State Regulation of Oil & Gas Exploration and Production Waste, December, 1990) recommended a three-party manifest system for controlling the disposition of exploration and production wastes. Most elements of this manifest system have direct applicability to the requirements of a similar system for commercial brine disposal. Critical elements for an effective manifest system include:

- a three-party form (original and two carbons) that would provide 1) names, addresses and telephone numbers of the brine generator (producer), transporter and disposal facility operator, 2) the date(s) the brine was collected, hauled, and unloaded at the commercial facility and 3) the volume of brine hauled. Copies of the entire form would be kept in the files of all three parties for a specified period of time after shipment. The IOCC suggested a period of three years; however, the UIC Director should determine an appropriate length of time based upon resource requirements;

- certification by both the transporter and injection facility operator that no hazardous waste or non-oil and gas production waste was mixed in with the brine. The form should require the signature of the facility operator/owner or authorized employee on an affidavit attesting that the recorded information is correct to the best of his knowledge. At present, this record may be the only basis for future enforcement and/or prosecution activities;

- a formal report by the operator of the facility to the regulatory Agency **and** the generator of any discrepancies in the composition, transported volumes or place of origin of the brine. These discrepancies

may be identified based upon personal observations or information contained on the three-party manifest form;

- o certification of the waste transporting company, by an appropriate State agency, that it is operating in compliance with specific permit conditions. In many cases the State Department of Transportation or equivalent Agency is responsible for registration of transporting companies operating within its borders

- o each source of brine (defined as produced from a specific **lease** rather than an individual well) be sampled at the time the generator enters into a contractual agreement with the commercial disposal facility.

II. Site Security

Presently, only three States (California, Louisiana, and Texas) have regulations which require that a commercial injection facility site be physically secured at all times. Since most commercial facilities are located in rural areas where illegal dumping of unauthorized wastes could take place without immediate detection, the UIC Director should incorporate requirements for site security in the permits of commercial facility operators. The Director should define what constitutes an effective security program on a site by site basis. EPA recommends that sites be secured by either:

1. complete enclosure of all wells, holding tanks/pits and manifold assemblies within a chain link or other suitable fencing; and

2. requiring that all gates and other entry points be locked when the facility is unattended; **or**

3. providing tamper-proof seals for the master valve on each well (a "lock-out" or chain & padlock system would be more secure; however, these devices could create a potential safety hazard if the well needed to be quickly shut in due to an emergency); and

4. installing locking caps on all valves and connections on holding tanks, unloading racks, and headers.

III. Inspections/Field Surveillance

EPA believes that the best deterrent to misuse of commercial facilities is a strong surveillance program. States and Regions should design their inspection programs so that commercial facilities are given a high priority. At a minimum the UIC programs should conduct annual, unannounced (within the

constraints of the SDWA requirements) inspections of each commercial facility. These inspections should include collection of a "grab sample" of fluid from the flow line to the well head or from holding ponds or tanks on the site. The frequency of inspections should be adjusted according to State or site specific factors.

The nature and extent of analysis conducted on the grab sample will also be site-specific. Since oil field brines vary widely in composition and are likely to contain many naturally occurring organic compounds, as well as traces of workover and other fluids commonly used down-hole in oil and gas production activities, EPA cannot recommend a single, meaningful set of parameters. In general, the analysis should be predicated on the location of the well and type of activity in the producing area. For example, in agricultural areas, pesticides and herbicides might be useful indicators of misuse of the well. In heavily industrialized areas the fluids could be analyzed for the presence of volatile organic solvents and PCBs or other chlorinated hydrocarbons.

Any complaint or inquiry by the public about a facility should be documented (by a telephone log or similar means) and incorporated into the UIC files. Serious or repetitive complaints and allegations about a specific facility should be followed up promptly by an on-site inspection by UIC personnel.

IV. Operator Education/Outreach Activities

The State or Regional UIC program Directors should:

- prepare a handbook outlining the physical operation (with appropriate illustrations) of the facility, sampling and reporting requirements and a discussion documenting the legal liabilities and negative public opinion that could accrue as a result of negligent or improper behavior on his part;

- provide the operator with information on regulatory requirement defining hazardous wastes and how to identify and avoid mixed waste stream injection into a disposal well; and

- conduct a one day seminar for all commercial facility operators in the State (or States) to explain the rationale and requirements of the guidance and to allow exchange of ideas and information between regulators and the regulated community.

It is further recommended that operators provide to generators, from whom they receive brine for disposal, formal notification that waste streams delivered to the disposal

facility will be periodically sampled and tested by the State. This notification may be delivered at the time the generator enters into a contractual agreement with the commercial disposal facility or it may be made part of the manifest language.

GUIDANCE IMPLEMENTATION

This document provides guidance to both primacy State and direct implementation UIC Directors on procedures to be followed with respect to the operation of Class II commercial brine disposal facilities. The guidance is a general statement of policy. It does not establish or affect legal rights or obligations. It is not finally determinative of any or all of the issues addressed. Agency decisions in any particular case will be made on the basis of specific facts and actions required to prohibit endangerment of USDWs.

For Direct Implementation programs, special conditions regarding site security should be incorporated into the permits. Regions should discuss this guidance with primacy States which have significant numbers of commercial facilities and strongly encourage them to adopt all or part of the provisions of this guidance.

Questions relative to this guidance should be addressed to Françoise Brasier, Chief - Underground Injection Control Branch or Jeff Smith on her staff. Françoise may be contacted at (202) 260-7077. Jeff's phone number is (202) 260-5586.

Appendix A

Level I, Level II, and Level III Violations

Level I Violations[1]:
Potential for Significant Environmental Contamination

Violation	SDWA or Regulatory Citation
Failure to demonstrate mechanical integrity resulting in potential or actual contamination of a USDW	144.52(a)(8), 146.8, 144.51(p), 144.28(g), and 144.12(a)
Unauthorized injection	144.11, 144.13, 144.14(b), 144.21(a), 144.23(a), and 144.27
Failure to operate properly (e.g., overpressure)	144.28(f), 144.51(e), 144.52(a), and Part 146
Failure to prevent movement into a USDW of fluids that may cause a violation of an MCL	144.12(a) and 1431
Failure to comply with a compliance schedule in a permit	144.53 and 144.51(l)(5)
Failure to comply with an Administrative Order	1423(c)
Falsifying information[2]	144.51(o), 1445(c), and 1431
Failure to construct well properly (casing and cementing)	144.28(e), Part 146, and relevant parts of 147
Failure to plug and abandon in accordance with an approved plan	144.23(b), 144.28(c), 144.51(o), 144.52(a)(6), and 146.10
Unauthorized plugging of a well in an unauthorized manner	144.28(c), 146.10 and 144.51(o)

[1]This list of violations is intended only as guidance. Unique circumstances of individual cases may lead case teams to classify violations not listed here as Level I violations or to classify a violation listed here at a different level.

[2]A unique violation that, although not directly linked to environmental harm, is considered a serious Level I violation. Case teams should consider criminal prosecution for this violation.

Level II Violations[3]: Critical Program Elements

Violation	SDWA or Regulatory Citation
Failure to show evidence of or to maintain financial responsibility	144.28(d), 144.52(a)(7) and 144.60-144.70
Failure to monitor	144.28(g), Part 146 and 144.51(a) and (j)
Substantial failure to comply with operating requirements	144.28(f), 144.51(a) and (e), and Part 146
Failure to conduct an MIT upon lawful request of the Agency or within legal deadlines and thereby demonstrate Mechanical Integrity	144.28(g)
Failure to submit a plugging and abandonment plan	144.23(b)(2) and 144.28(c)
Failure to allow inspection and entry	144.51(i)
Failure to apply for a permit	144.25, and 144.31
Failure to submit an annual report	144.28(h)
Failure to transfer a permit properly	144.38
Failure to submit 24-Hour report and/or written follow-up	144.28(b) and 144.51(l)(6)
Failure to submit information	144.27

[3]This list of violations is intended only as guidance. Unique circumstances of individual cases may lead case teams to classify violations not listed here as Level II violations or to classify a violation listed here at a different level.

Level III Violations[4]: Other Violations

Violation	SDWA or Regulatory Citation
Failure to retain records	144.28(i) and 144.51(j)(2)
Failure to make required notification	144.23(b)(3), 144.28(j)(1)&(2), 144.28(l), 144.28(g) 144.51(l)&(n), and 144.14(c)(1)
Failure to submit a report, to submit a complete report, to submit a timely report, to submit an accurate report	144.28(h) and 144.28(k)
Failure to submit inventory information in a timely fashion	144.26(d)
Failure to submit information	144.14(c), 144.26. and 146.52

[4]This list of violations is intended only as guidance. Unique circumstances of individual cases may lead case teams to classify violations not listed here as Level III violations or to classify a violation listed here at a different level.

Appendix B

UIC Program Judicial and Administrative Order Settlement
Penalty Policy Calculation Worksheets

UIC Program Judicial and Administrative Order Settlement Penalty Policy
Individual Violation Settlement Calculation Worksheet

Preliminary Information

Name of Person Filling out Form: _____

Date: _____

Operator/Facility Name: _____

Class of Well: _____

Violation: _____

Step 1: Calculate Statutory Maximum (Judicial and Administrative)

(a) Length of violation (in days): _____

(b) Maximum administrative penalty per day: $5,000 (Class II wells) or $10,000 (Class I, III-V)

(c) Number of wells in violation: _____

Judicial Statutory Maximum: (a) * (25,000) * (c) =

_____ * 25,000 * _____ = $_____

Administrative Statutory Maximum: (a) * (b) * (c) =

_____ * _____ * _____ = $_____

Step 2: Calculate Economic Benefit Component

Determine present value of avoided and delayed costs, using BEN model (attach all BEN printouts).

_____

Step 3: Calculate Gravity Component

Refer to Chart 1, Unadjusted Gravity Component Calculation Formula (p. 10 in Policy) to determine appropriate value for each of the four factors (A) through (D).

(A) Seriousness of violation ($100-25,000): $_____

(B) Economic impact on the violator (0.3, 0.7, or 1.0): _____

(C) Duration of violation (0-125+): _____

(D) Number of wells in violation (1-125+): _____

(E) Unadjusted Gravity Component: (A) * (B) * [(C) + (D)] =

_____ * _____ * (_____ + _____) = _____

(F) Gravity Component Adjustment Factor (-30 to +150%): _____%

Gravity Component: (E) + {[(F)/100]*(E)} =

_____ + [(_____/100) * _____] = _____

Step 4: Apply Adjustment Factors to Sum of All Economic Benefit and Gravity Components

(G) Calculate Preliminary Settlement Amount:
Economic Benefit Components + Gravity Components: _____

(H) Maximum Ability to Pay: _____

(I) Adjustment for Ability to Pay: If (H)<(G), then (G)-(H), else zero = _____

(J) Litigation Considerations (0 to 100%): _____%
(0 = very weak case, 100 = good case)

Final Settlement Amount: [(G) - (I)] * [(J)/100]: (_____ - _____) * (_____/100)=

_____

Adjustment Factor for the Gravity Component Calculation Worksheet

Violator or Case Name: _____

Case Team Member Name/Date: _____

Factor	Comment	Adjustment
History of Violation (+ only)		
• Number of previous violations	_____	(+)_____
• Similarity of previous violations	_____	(+)_____
• Response to previous violations and enforcement actions	_____	(+)_____
Degree of Cooperation/Noncooperation		
• Rapidity of violation correction and/or damage mitigation prior to enforcement action	_____	(+/-)_____
• Effort put forth by violator to correct violation in response to enforcement action	_____	(+)_____
• Use of delaying tactics	_____	(+)_____
Willfulness/Negligence		
• Control over violation	_____	(+/-)_____
• Foreseeability of events leading to violation	_____	(+/-)_____
• Precautions taken to avoid violation	_____	(+/-)_____
	TOTAL:	_____ (-30 to +150%)

UIC Settlement Penalty Policy Calculations

Duration:

Start date of violation: _____

End date of violation: _____

Duration of violation: _____

Economic Impact:

Gross sales value: _____

Source of information: _____

_____

Economic impact on the violator (0.3, 0.7, 1.0): _____

Other Calculations:

Appendix C

Summary Worksheet

Summary Worksheet for Multiple UIC Violations

Administrative statutory maximum: _____
($5,000 or $10,000 per day or $125,000 total)

Civil statutory maximum: _____
($25,000 per day)

Total economic benefit component: _____

Total adjusted gravity component: _____

Total final settlement amount: _____

SUMMARY OF COMPONENTS BY INDIVIDUAL VIOLATION

Violation	Economic Benefit	Adjusted Gravity	Final Settlement
Totals:			

Appendix D

Glossary of Terms

Glossary of Terms

Adjusted Gravity Component The end product of applying the Adjustment Factors to the **Unadjusted Gravity Component.**

Adjustment Factors (Preliminary Settlement) These factors are Ability to Pay and Litigation Considerations. The case team has the ability to adjust the **Preliminary Settlement Amount** up or down based on details of the specific violation in the two Adjustment Factor categories.

Annual Expenses Pollution control costs, typically operation and maintenance costs, that the violator completely avoided by delaying compliance or by ignoring the regulatory requirement. Annual expenses are one input used in the EPA's BEN computer model and are a portion of the **Economic Benefit Component.**

Current Dollars The benefit, in current dollars (i.e., dollars at the time the penalty is paid), of violations that have taken place in the past. **Annual Expenses**, **Delayed One-Time Nondepreciable Costs**, and **Initial Capital Investments** must be escalated to Current Dollars. This calculation is performed by the BEN computer model.

Delayed One-Time Nondepreciable Costs These are nondepreciable expenses that have been delayed by the violator's failure to comply promptly with regulatory requirements. Many of the delayed costs associated with UIC violations will fall into this category which includes land purchase and well repairs. Most of these costs are tax-deductible, although land is not.

Economic Benefit Component The sum of the present, tax-adjusted values of **Initial Capital Investments**, **Delayed One-Time Nondepreciable Costs**, and **Annual Expenses**. It is calculated using EPA's BEN computer model.

Final Settlement Amount The **Preliminary Settlement Amount** after adjustment according to the **Adjustment Factors (Preliminary Settlement)**.

Gravity Component Adjustment Factor The elements incorporated in this factor include the degree of willfulness, good faith efforts to comply, history of violation, and other elements not incorporated into the **Unadjusted Gravity Component**. The case team has the ability to adjust the **Unadjusted Gravity Component** up or down within a fixed range based on details of the specific violation.

Independently Assessable Violations These are dissimilar violations. A separate **Adjusted Gravity Component** and **Economic Benefit Component** must be calculated for each of these violations.